IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**APPEAL FROM THE EXAMINER TO THE BOARD OF PATENT APPEALS AND INTERFERENCES**

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| Application No.: | | 09/922,412 |
| Applicant: | : | Cantwell, Robert W. |
| Filed | : | August 3, 2001 |
| Confirmation No. | | 7272 |
| Title: | : | System and Method of Multiplexing Data From Multiple Ports |
| Art Unit | : | 2616 |
| Examiner | : | Roberts, Brian S. |
| Docket | : | 131105-1006 |
| Customer No | : | 32914 |

**MAIL STOP: APPEAL BRIEF PATENTS**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

**APPEAL BRIEF**

Applicants have appealed to the Board of Patent Appeals and Interferences from the decision of the Examiner mailed February 5, 2007, finally rejecting Claims 1 and 5-22. Applicants filed a Notice of Appeal on June 5, 2007.

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## (i) REAL PARTY IN INTEREST

The present application was assigned to Metera Networks, Inc., by an assignment from the inventor recorded on August 17, 2001, in the Assignment Records of the United States Patent and Trademark Office at Reel 012091, Frame 0285.

The present application was subsequently assigned to Fujitsu Network Communications, Inc. by an assignment from Metera Networks, Inc., recorded on December 4, 2001, in the Assignment Records of the United States Patent and Trademark Office at Reel 012331, Frame 0712. The present application was subsequently assigned to Fujitsu Limited by an assignment from Fujitsu Network Communications, Inc., recorded on July 18, 2005, in the Assignment Records of the United States Patent and Trademark Office at Reel 016778, Frame 0746.

## (ii) RELATED APPEALS AND INTERFERENCES

There are no known appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in this pending appeal.

**(iii) STATUS OF CLAIMS**

Claims 1 and 5-22 stand rejected pursuant to a Final Office Action mailed February 5, 2007. Claims 2-4 have been cancelled. Claims 1 and 5-22 are presented for appeal.

**(iv) STATUS OF AMENDMENTS**

There are no amendments that have not been entered.

## (v) SUMMARY OF CLAIMED SUBJECT MATTER

In telecommunications systems, it is sometimes necessary or desirable to aggregate asynchronous framed data from multiple ports and time-division multiplexed (TDM) traffic onto a synchronous link for transport across a network. For example, Ethernet traffic from a local area network is aggregated with DS3 (or STS-1) TDM data onto a single optical uplink, which is inherently time-division multiplexed and synchronous. (p. 2, lines 1-8).

One prior art approach, which is described in the application, is to map framed data from each port (*e.g.* an Ethernet port) to a separate synchronous payload envelope (SPE). (See p. 2, lines 9-17.) Doing so preserves information that uniquely identifies the port on which Ethernet data was received, for the reason that each SPE corresponds to a different port.

The claimed invention takes a contrary approach. It maps framed data from more than one port into serial data stream, which allows the same SPE to carry the data from different Ethernet ports. Although the prior art method teaches that this would result in a loss of information about the source port, the claimed invention avoids this loss by inserting a unique identifier in each frame of framed data. Thus the claimed invention has at least the advantage of greater bandwidth efficiency as compared to this prior art approach, without loss of information on the source port.

Independent claims 1 and 6 are directed to telecommunication equipment comprising a switch (element 12 of figure 2) and a multiplexer (30 of figure 2) coupled to the switch for multiplexing data frames from a plurality of ports (element 26 of figure 2) into a single serial data stream (element 16 of figure 2). The switch inserts into a predetermined header field (*e.g.* VLAN field 46 of Ethernet header of figure 3) of each data frame an identifier that uniquely identifies the port from which the frame originated. (*e.g.* vp. 5, lines 10-14). The multiplexer inserts the serial data stream into a single synchronous payload envelope (SPE) (p. 5, lines 5-8). Multiple SPEs could be used to carry the data stream, but one SPE is carrying data frames from multiple ports.

Independent claims 9, 12 and 17 are directed to a method for multiplexing framed data from a plurality of ports that are comprised of adding a unique port

identifier (p. 5, lines 1-14) to each frame for uniquely identifying the port from which the data came prior to multiplexing the data into a single data stream for transmission by a synchronous transmission medium. (p. 5, lines 14-19). Claims 11 and 17 further require inserting the data stream into an SPE, and claim 12 further requires that the unique port identifier be inserted into a VLAN ID field (element 46 of figure 3) of a MAC frame 41.

**(vi) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

Whether the rejection of claims 1 and 5-22 under 35 U.S.C.§103(a) as being unpatentable over the combination of U.S. patent no. 7,088,714 of Athreya et al. ("Athreya") and U.S. patent no. 6,649,519 of Russell et al. ("Russell") is in error.

**(vii) ARGUMENT**

A. Standard

Obviousness under 35 U.S.C. § 103(a) is a question of law that is resolved based on underlying factual inquiries. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966). *See also, KSR International Co. v. Teleflex Inc.,* 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391 (2007*)*. The factual inquiries that must be determined are: (1) the scope and content of the prior art; (2) the differences between the claimed invention and the prior art; and (3) the level of ordinary skill in the pertinent art. *Graham*, 383 U.S. 1, 17-18, 148 USPQ at 467. Evidence of "secondary considerations" may also be taken into account in order to "give light to the circumstances surrounding the origin of the subject matter sought to be patented." 383 U.S. at 18, 148 USPQ at 467.

The person of ordinary skill in the art is a hypothetical person who is presumed to know the relevant prior art. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962, 1 USPQ2d 1196, 1201 (Fed. Cir. 1986). In determining this skill level, the court may consider various factors including "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *Id.* (*In re GPAC*, 57 F.3d 1573, 1579, 35 USPQ2d 1116, 1121 (Fed. Cir. 1995)). In a given case, every factor may not be present, and one or more factors may predominate. *Id.* at 962-63, 1 USPQ2d at 1201.

"Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinnings to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). *Accord*, *KSR,* at 1741, 82 USPQ2d at 1396. *See also,* "Examination Guidelines for Determining Obviousness under 35 U.S.C. §103 in view of the Supreme Court decision in KSR International, Co. v. Teleflex Inc," Federal Register. Volume 72, No. 195 (October 10, 2007) at 57527 (Factual findings made by Office personnel are necessary underpinnings to establish obviousness. Once findings of fact are articulated, Office personnel must provide an explanation to support an obviousness rejection under 35 U.S.C. §103.)

B. Argument

There are several errors in the reasoning underlying the rejection of each of the claims, any one of which destroys the *prima facie* rejection made by the examiner of each claim.

1. The rejection of claims 1, 5-22 is in error for the reason that Athreya fails to teach a unique port identifier.

Supporting the examiner's rejection of each claim is a contention that Athreya teaches insertion into a Ethernet frame a unique port identifier; in other words, an identifier that uniquely identifies the one of the plurality of ports on which the frame was received. Athreya uses a standard VLAN ID. The examiner equates the VLAN ID to a unique port identifier.

Although the port identifies the VLAN (see Col. 5, lines 11-14), the VLAN does not necessarily identify the port. For example, it is possible that traffic on multiple ports is assigned to the same VLAN. It is respectfully submitted that there is nothing in the lengthy passage cited by the examiner from column 4, line 62, to column 5, line 20 in Athreya, to suggest that there is an one-to-one relationship between a VLAN and a port. The examiner has made an erroneous assumption, and consequently has read into Arthreya a teaching that is not present and is not supported by the evidence of record.

As the limitation of a unique port identifier is not met by the combination, and no explanation for how using a unique port identifier would be obvious, a *prima facie* rejection for obviousness has not been made for at least this reason.

2. The rejection of claims 1, 5-22 is in error for the reason that Russell et al. fails to teach multiplexing of frame for multiple framed data ports onto a single SPE.

Second, the examiner contends that Russell et al. multiplexes, through terminal multiplexers 100, 101 or 903, Ethernet frames from a plurality of ports onto "one or more SDH or SONET payloads," citing a lengthy passage beginning on line 48 in column 5 and continuing to line 64 of column 6. (Final Office action, p. 3, first full paragraph). However, the claim requires multiplexing of data from a plurality of ports into a single data stream. The undersigned representative can find no mention in

that passage of multiplexing multiple Ethernet ports into a single serial stream, such that frames from different ports are carried in the same SPE.

Russell explains in the passage cited by the examiner that efficient conversion between framed based "datacoms systems" (as represented by routers 103 and 104) and the synchronous digital systems needs to be achieved and identifies "mismatch of data rates between the datacoms domain and the telecommunications domain" as a problem to be solved.

Russell then gives a detailed explanation of a solution for this problem, which is to incorporate a synchronous digital payload mapper 200 on a single Ethernet port card. (Col. 6, lines 65-67 and Fig. 2). There is one physical port 201, a rate adaptation means 203 and a payload mapper 204, which is mislabeled in FIG. 2 as "200". (Col. 7, lines 33-44). The payload mapper maps data from the Ethernet port, after the data rate has been adapted by rate adaption means 203, into "a plurality of SDH payloads, for example VC3, VC4 or VC12, thereby accessing the synchronous network." (Col. 8, lines 15-19).

Russell teaches a proposition opposite from the proposition the examiner cites. It teaches mapping one Ethernet port onto multiple SDH payloads, the number of which depends on the data rate of the Ethernet port (see col. 7, lines 22-33). Russell states:

> The specific embodiments and specific methods disclosed herein may enable the following advantages:
>
> Firstly, compared to the prior art systems which interface Ethernet through a conventional telecoms interface, eg E1, T1, by dispensing with the telecoms interface, by use of the Ethernet port card as described hereinbefore, an equipment cost saving may achieved, because there is no need for adaption of Ethernet data into a telecoms interface, eg E1 or T1.
>
> Secondly, port consolidation may be achieved. Instead of having a large number of ports at a head end, as in prior art systems, one frame based data port per multiplexer may be provided. A saving on equipment and wiring may be achieved.

(Col. 10, lines 21-37, emphasis supplied). Russell does not disclose data from multiple Ethernet ports being multiplexed into a serial stream.

At one point to during the examination, the examiner pointed to element 908, a firewall, in FIG. 9 for the proposition that synchronous terminal multiplexer 903 is multiplexing frames from a plurality of ports. However, Russell seems only to be making the point that the switch 904 may, instead of being connected directly, be connected through a router that acts as a firewall. It states:

> In the example shown in FIG. 9, at an end user location 901, a PBX 902 may communicate with a synchronous terminal multiplexer 903 in conventional manner and an Ethernet switch 904 may communicate directly with the synchronous multiplexer via, for example a 100 MBits/s link 905 to provide a private frame based data network via a central office location 906 supporting a public frame data channel signified by router 907. Similarly, Ethernet switch 904 may access a public data frame network via a firewall router 908.
>
> (Col. 9, lines 27-42)

Thus, Russell does not in fact teach multiplexing multiple ports into a serial data stream. To imply otherwise is directly contrary to other statements in Russell, where it expressly teaches avoiding multiple ports. Therefore, due to at least this factual error, which underlies the rejection of each of the claims 1 and 5-22, a *prima facie* case of obviousness of these claims has not been made.

3. The rejection of claims 1 and 5-22 is in error for the reason that the reasoning or explanation does not support a legal conclusion of obviousness.

The examiner's line of reasoning for why someone of ordinary skill in the art would consider the differences between the prior art and the claimed subject matter to be obvious contains substantial errors, and therefore a *prima facie* case of obviousness has not been established.

In essence, the examiner contends that it would have been obvious to modify the system and method of Athreya to include multiplexing data frames from a plurality of ports for transmission over an optical network "because it allows frames to be transmitted at a high rate over a SONET backbone network."

The differences between Athreya and the broadest independent claims are substantial. Athreya concerns generally extending the concept of VLANs to wide area networks. (See col. 1, lines 31-32). It mentions tagging Ethernet frames with VLAN tags depending on the port on which Ethernet frames are received. However, the

examiner admits that Athreya "does not teach a multiplexer coupled to the switch and operable to multiplex the data frames from the plurality of ports into a single serial data stream, the multiplexer being operable to multiplex the data from the plurality of ports into a single synchronous payload envelope." As mentioned above, applicants would add that it also does not teach tagging each frame with an identifier that uniquely identifies the port on which the frame was received.

Also as explained above, Russell concerns generally transporting framed data over a synchronous transport network. In addition to the differences between Russell and at least the independent claims mentioned above, there is no mention of tagging Ethernet frames for purposes of preserving source port information for use after demultiplexing the frames from the synchronous transport network. The two references are operating at different levels. The simplistic notion that it would be obvious to modify Athreya based on the teachings of Russell simply does not make sense. Metaphorically, from a networking perspective, Athreya's system would sit on top of Russell's. Desiring higher data rates does not explain why someone of ordinary skill in the art would want to modify Athreya based on the teachings of Russell, much less teach specific modifications to make it operate at higher data rates by multiplexing data. Ethernet networks operate at fixed rates.

The subject matter of the claims concerns how to transport framed data on a synchronous transport network. Russell is concerned with this issue, but does not teach either multiplexing framed data into a serial stream or preserving port information while doing so. Turning it around, Athreya provides no evidence or suggestions for modifying Russell in this way.

Furthermore, and most importantly, Russell quite clearly teaches against having multiple Ethernet ports feeding a line multiplexer. As mentioned above, Russell teaches incorporating a synchronous digital payload mapper 203 (mislabeled as "200" on FIG. 2) on a single Ethernet port card. (Col. 6, lines 65-67 and Fig. 2). The reference further states:

> Secondly, port consolidation may be achieved. Instead of having a large number of ports at a head end, as in prior art system, <u>one frame based data port per multiplexer</u> may be provided. A saving of equipment and wire may be achieved.

(Col. 10, lines 32-37, emphasis supplied).

Any modification of Russell or Athreya in the manner urged by the examiner is contrary to the teachings of Russell of one data port per multiplexer.

Therefore, due to these errors in reasoning, which are applicable to the rejection of each of claims 1 and 5-22, a *prima facie* case of obviousness has not, and cannot, be established.

## CONCLUSION

In view of the errors noted above in the examiner's rejections of claims 1 and 5-22, Applicant respectfully requests the Board of Patent Appeals and Interferences to reverse the final rejection of the Examiner and instruct the Examiner to issue a Notice of Allowance of all claims.

The Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 07-0153 of Gardere Wynne Sewell LLP, referencing docket number 131105-1006.

Respectfully submitted,

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**(viii) APPENDIX A – CLAIMS**

1. Telecommunication equipment, comprising:

a switch having a plurality of ports for receiving data from a plurality of ports and switching the data to a plurality of ports, the switch operable to insert a unique port identifier into a predefined header field of the data from each port to identify the port from which the data is received; and

a multiplexer coupled to the switch and operable to multiplex the data frames from the plurality of ports into a single serial data stream, the multiplexer being operable to multiplex the data from the plurality of ports into a single synchronous payload envelope.

5. The telecommunication equipment, as set forth in claim 1, further comprising a subscriber access multiplexer operable to receive the single serial data stream from the multiplexer, demultiplex the serial data stream into data from each port, and route the data based on the unique port identifier.

6. The telecommunications equipment, as set forth in claim 1, wherein the data includes data in Ethernet data frames and the predefined header field includes a virtual LAN field.

7. The telecommunication equipment, as set forth in claim 1, further comprising:

a subscriber access multiplexer operable to receive data from a plurality of sender nodes in a network and operable to insert the unique port identifier based on an

IP address of the sender node of the data, and multiplex the data into a single serial data stream;

the multiplexer being operable to receive the single serial data stream from the subscriber access multiplexer and demultiplex the data; and

the switch being operable to switch the demultiplexed data based on the unique port identifier to the plurality of ports.

8. The telecommunication equipment, as set forth in claim 1, further comprising a subscriber access multiplexer operable to receive the single serial data stream from the multiplexer and route the data to a destination network node based on the unique port identifier, a MAC address and IP address in the data.

9. A method comprising:

receiving data from a plurality of ports;

adding a unique port identifier to the data from each port to identify the port from which the data came;

multiplexing the data from the plurality of ports into a single data stream for transmission by synchronous transmission medium.

10. The method, as set forth in claim 9, wherein receiving data comprises receiving data from a plurality of Ethernet ports.

11. The method, as set forth in claim 9, wherein multiplexing the data comprises multiplexing the data into a single synchronous payload envelope.

12. The method, as set forth in claim 9, wherein adding the unique port identifier comprises inserting the unique port identifier into a VID field of a tagged MAC frame of the data.

13. The method, as set forth in claim 9, further comprising converting the single serial data stream into SONET optical signals for transmission.

14. The method, as set forth in claim 9, further comprising:

receiving the single serial data stream;

demultiplexing the single serial data stream into data from each port; and

routing the data from each port based on the unique port identifier.

15. The method, as set forth in claim 9, further comprising:

receiving data from a plurality of sender nodes in a network;

inserting a unique port identifier based on an IP address of the sender node of the data; and

multiplexing the data into a single serial data stream for transmission;

receiving the transmitted data and demultiplexing the data into data from each sender node; and

switching the demultiplexed data based on the unique port identifier to the plurality of ports.

16. The method, as set forth in claim 9, further comprising receiving the single serial data stream and routing the data to a destination network node based on the unique port identifier, a MAC address and IP address in the data.

17. A method of multiplexing data from a plurality of ports for transmission, comprising:

receiving framed data from the plurality of ports;

adding a unique port identifier to a predetermined header field of the framed data from each port to identify the port from which the data came;

multiplexing the data from the plurality of ports into a single synchronous payload envelope; and

converting the multiplexed data into a optical signal for transmission.

18. The method, as set forth in claim 17, wherein receiving data comprises receiving data from a plurality of Ethernet ports.

19. The method, as set forth in claim 17, wherein adding the unique port identifier comprises inserting the unique port identifier into a VID field of a tagged MAC frame of the data.

20. The method, as set forth in claim 17, further comprising:

receiving the optical signal and converting to a single data stream;

demultiplexing the data stream from each port; and

routing the data from each port based on the unique port identifier.

21. The method, as set forth in claim 17, further comprising:

receiving data from a plurality of sender nodes in a network;

inserting a unique port identifier based on an IP address of the sender node of the data;

multiplexing the data into a single serial data stream for transmission;

receiving the transmitted data and demultiplexing the data into data from each sender node; and

switching the demultiplexed data based on the unique port identifier to the plurality of ports.

22. The method, as set forth in claim 17, further comprising receiving the single serial data stream and routing the data to a destination network node based on the unique port identifier, a MAC address and IP address in the data.

**(ix) APPENDIX B - EVIDENCE**

None.

## (x) APPENDIX C- RELATED PROCEEDINGS

None.